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ABSTRACT

The purpose of this study was to investigate within the vicarious learning paradigm the effects of manipulated self-evaluation treatments and model performance conditions on both the acquisition and subsequent performance of novel and self-reinforcing responses. It was predicted that subjects receiving either high or low self-evaluation treatments would imitate a greater number of novel and self-reinforcing responses demonstrated by self-similar rather than self-disparent models performing the same task. Subjects were 51 first, second, and third grade private school children. The experimental task was a variation of the "skill" game. Results generally support the hypothesis. (Author/HMV)

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The Effects of Manipulated Self-Evaluation and Model Performance on Imitation and Incentive Reproduction of Novel and Self-Reinforcing Behavior[1]

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It seems evident from experimental research and informal observation alike that vicarious learning experiences involving exposure to both symbolic and live, human models account for a significant amount of human learning. Although historically learning through observational means has been referred to as "imitation," the contemporary literature describes the phenomenon as generally synonymous with "observational learning," "identification," "modeling," "copying," "social facilitation," "contagion," and "vicarious learning." Learning of this type is usually referred to as observational, vicarious, or modeling in behavior theory, and identification in most theories of personality.

Vicarious learning events are conceptualized by modern social learning theorists as situations in which new responses are acquired, or previously learned responses are modified, in the absence of overt responding on the part of the observer. In demonstrating vicarious learning phenomena, the modeling paradigm requires that an observer simply view a modeled performance while making no overt instrumental responses. In addition, reinforcing stimuli are not directly administered to the observer during response acquisition (observation) trials. Consistent with more traditional learning paradigms, the course of response acquisition through observation proceeds over a series of repeated exposures to either real or symbolic modeled performances. The development of mediational responses, in the form of imaginal or implicit verbal representations of the perceived stimulus events, are considered by Bandura (1969) to play a critical role in the vicarious learning process.

Past research in support of "modeling" as an important process in the innovation of social behavior has adequately defined parameters determining overt imitation and/or recall of a model's behavior. However, research in observational learning has not been generally concerned with the relationship between

self-processes and susceptibility to learning through vicarious means. Certain "personality" characteristics and their interactions with situational factors (e.g., experimental tasks), may alter predictions derived from past modeling research. For example, dependent children show more imitative behavior than independent children (Jakubczak & Walters, 1959, D. Ross, 1966). Imitation has also been enhanced by a history of failure, especially punishment for independence (Gelfand, 1962), and by social deprivation experience (Rosenblith, 1961).

Since self-evaluative factors have not been carefully controlled and/or manipulated in past modeling research, one might ask whether social-learning theorists have over-generalized past research findings as useful in educational and psychotherapeutic settings. This seems reasonable since the majority of research findings to date indicate that modeling predictions are confirmed when subjects have no particular concept of their "competence" on the tasks models perform, i.e., observers bring little specific, task-related self-evaluation to the observational setting.

Since self-evaluation processes are assumed to develop through interaction with others and through direct reinforcement history, it seems important for social-learning theorists to investigate the relationship between self-evaluation processes and learning through vicarious means. If learning through observation can be viewed as occurring within an interpersonal context, then the relationship between learners' self-evaluations and modeling stimuli has implications for research.

The purpose of this study was to investigate within the vicarious learning paradigm the effects of manipulated self-evaluation treatments and model performance conditions on both, the acquisition, and subsequent performance of novel and self-reinforcing responses. It was predicted that subjects receiving either high or low self-evaluation treatments would imitate a greater number of novel

and self-reinforcing responses demonstrated by self-similar than self-disparent models performing the same experimental task. Control subjects, devoid of task experience were expected to imitate a greater number of novel and self-reinforcing behaviors demonstrated by high performance (successful) than low performance (unsuccessful) models. In addition it was hypothesized that differences observed between subjects during imitation trials would be erased under recall conditions evidencing essentially equivalent amounts of learning. Thus, experimental treatments and model performance conditions were predicted to have their primary effects on the performance of behaviors learned through vicarious processes, rather than on their acquisition.

METHOD

Subjects

Subjects were selected from a population of 97 first-, second-, and third-grade private school children in Athens, Georgia. Owing to the nature of the experimental treatments and ethical guidelines established by the American Psychological Association (1973) for conducting research with human Ss, parental permission for participation in the experiment was obtained.

Permission for participation in all treatment groups was granted for 51 Ss. These Ss were blocked by grade level and sex and randomly assigned to treatment groups. Of 25 Ss granted permission for participation in specified groups only, 9 were assigned to treatment conditions to equate groups by sex of S and grade level.

This procedure resulted in 6 groups of 10 Ss each, matched by grade and sex. The total sample (n = 60) consisted of 30 male and 30 female Ss, with an approximately equal number of each sex selected from each of three grades. The mean age of subject groups varied from 92.4 to 94.9 months.

Experimental Design

A 3 X 2 factorial analysis of variance design was used with three levels of manipulated self-evaluation and two levels of model performance. By way of summary, the independent variables were as follows:

A. Self-Evaluation Conditions (3 levels)
   1. High Self-Evaluation (success)
   2. Low Self-Evaluation (failure)
   3. Neutral Self-Evaluation (control)

B. Model Performance Conditions (2 levels)
   1. High Performance Model (success)
   2. Low Performance Model (failure)

Subjects were nested within self-evaluation and model performance levels to form 6 treatment groups, with 10 Ss per group. Sex of model (M) was counterbalanced with sex of S across experimental design rows in an ABBAAB manner.

Experimental Apparatus

Experimental apparatus for the study consisted of the following: (1) three plastic cups (Blue, Green, Yellow); (2) a standard, felt-covered card table; (3) three chairs; (4) a removable cardboard partition; and (5) a large box of assorted candies used as prizes.

Experimental Task

The experimental task was a variation of the "shell" game. When S arrived at the experimental room, he was given game rules and instructions and seated at the table opposite the E. The task was one where the E arranged three cups in a mixed-position series from trial to trial behind a removable partition screening a prize placed under one of the cups from the S's view. When the partition was removed on any trial, the S was faced with three colored cups (lip down) from

which he selected one, and only one.

When the S selected a cup, he could accumulate prizes (candy) if he had correctly guessed the prize cup. The partition was replaced after each trial and the E varied the color and position of the correct cup, screened from S's view. Success and failure trials were experimentally controlled by placing prizes under all cups, or under no cups, on any particular trial.

When presenting the cups to a confederate M in the presence of S during response acquisition (observation) trials, the E provided the M with subtle head position cues designating the prize cup. When the correct cup was to the E's left, he tilted his head to the left, etc. This procedure allowed the M to make controlled, correct or incorrect choices, depending upon model performance condition, in full view of the S seated to the E's left. Allowing the S to observe activities on both sides of the partition during the M's performance added to the believability of the experimental task and modeling cues.

Experimental Procedure and Treatments

Subjects in High Self-Evaluation (HSE) and Low Self-Evaluation (LSE) groups initially received 15 task trials. Positive and negative-neutral verbal feedback, combined with fixed wins and losses were administered to HSE and LSE Ss by E, to manipulate self-evaluation levels. Control Ss, in neutral self-evaluation conditions, received no manipulated self-evaluation treatment.

Each HSE S was first administered 15 task trials during which scores were controlled by E. Success and failure trials were distributed within the trial series to add to the believability of the task. Over the series of 15 trials, each HSE S made 8 correct and 7 incorrect choices. After each success trial, the E provided positive evaluative feedback in the form of verbal comments (e.g., "Gee! That's a good guess!"), stated with a praising inflection and accompanied by warm smiles. On failure trials, the E offered no evaluative feedback, simply

stated "Let's try again," and proceeded to the next trial.

Like HSE Ss, Ss in LSE treatment conditions were initially administered 15 task trials during which scores were controlled by E. Over the trial series, each LSE S made 3 correct and 12 incorrect choices. After each failure trial, E provided negative-neutral evaluative feedback (e.g., "Oops! You certainly missed that time!"), accompanied by wry frowns. On success trials, the E offered no evaluative comments and simply proceeded to the next trial.

Control Ss in the Neutral Self-Evaluation condition (NSE) received no initial task trials nor verbal feedback manipulation. Without direct task experience, control Ss were assumed to have little, if any, self-evaluation in relationship to the experimental task.

After initial trials on the task, HSE and LSE Ss were administered two scales to assess the effectiveness of manipulated self-evaluation treatments. The first instrument required S to rate his task performance on a five-point rating scale, ranging from 1--Very Good to 5--Very Poor. The second instrument was a self-identification procedure requiring S to point to one of five caricatures of children varying in scaled emotional expression from Very Happy to Very Sad. The S was instructed to choose the caricature that best represented how he (S) felt after playing the game for the first time. Rating scale and self-identification procedure scores were subjected to a Median test as outlined by Siegel (1956, p. 111). Results of the Median test ($_{X}^{2} = 12.10$, $p < .001$; $X^{2} = 5.38$, $p < .05$) indicated that feedback treatments were effective in differentially manipulating self-evaluation levels for HSE and LSE Ss respectively, as measured by these instruments.

Having completed initial task trials and self-rating and identification procedures, each HSE, LSE, and Control S participated in observational learning trials by watching an adult M play the cup game. Control Ss, devoid of

manipulated self-evaluation trials, began the experiment at this point. Depending upon assignment to model performance conditions, each S observed either a successful, high performance M (HPM), or an unsuccessful, low performance M (LPM). Half of the Ss in each treatment group (n = 10) observed a HPM, the other half observed a LPM. Two trained graduate students (one male, one female) served as Ms in the experiment.

After the M was introduced to the S and given task instructions, the E administered a series of 15 trials to M while S (now seated to E's left) observed activities on both sides of the partition. For the HPM, all trials were "success" trials except trials one and eight. For the LPM, all trials were "failure" trials except trials one and eight.

Vicarious Learning Trials (Modeling Conditions)

During vicarious learning trials, each S observed M participate in the cup game for a series of 15 trials. While the S observed, M emitted two classes of response cues: (1) novel behaviors demonstrated before the instrumental act of selecting a cup; (2) self-reinforcing behaviors demonstrated after either wins or losses, depending upon model condition. Two kinds of novel responses were emitted by HPM on each trial before picking up a cup. The first of these (verbal) consisted of the phrase "SKIDDLE, DIDDLE, BLUE!" (or the name of another cup color). The second (motor), emitted in close succession to the verbal phrase, was a distinctly observable, circular motion of M's right hand (palm flat and down) over the tops of the three cups. After saying the novel phrase and circling the hand, M tapped the tops of the cups lightly with the fingers of the right hand, stated a cup color, and selected a cup.

Like the HPM, the LPM emitted two classes of novel responses before selecting a cup. The first of these (verbal) consisted of the phrase "BINGO, JINGO, YELLOW!" (or the name of another cup color). The second (motor) was a

distinctly observable, repetitive tapping of the fingers of both hands on the table top in a "drumming" manner. After saying the phrase and drumming the fingers, the LPM tapped the tops of the cups like HPM, stated a cup color, and selected a cup.

Two kinds of self-reinforcing responses were emitted by HPM and LPM after each winning or losing trial respectively. For the HPM, the first of these (verbal) consisted of self-rewarding and praising comments, e.g., "Hurray! I won!" The second (motor) consisted of M's distinctly and lightly slapping the table top with the right hand, followed by extension of both arms above the head. These cues were emitted concomitantly with verbal, self-praising remarks. On losing trials (one and eight), the HPM emitted both classes of novel responses, but eliminated self-reinforcing responses.

Like the HPM, the LPM emitted two classes of self-reinforcing responses. The first of these (verbal) consisted of self-critical comments stated with a disgusted connotation, e.g., "Phooey!" The second class (motor) consisted of LPM's distinctly and loudly slapping the table top with the right hand, followed by a loud slap of the right thigh. These cues were emitted concomitantly with verbal, self-critical remarks. On winning trials (one and eight), the LPM emitted both classes of novel responses, but eliminated self-critical responses.

After M received 15 task trials while observed by a given S, he/she was excused from the setting and asked to return to an adjoining room so the observing S could play the game a second time. (The M actually became an observer (O) at this point in the experiment and recorded the S's imitation and incentive reproduction scores in an adjoining room via video monitor.)

Imitation Trials

After M departed from the room, the S was asked to again be seated opposite E, and was induced to play the cup game again by E's explaining the additional

rewards that might be accrued. All Ss received 15 additional trials at this point. Subjects exposed to HPM during vicarious learning trials received 10 success and 5 failure trials. Those exposed to LPM received 10 failure and 5 success trials. After each trial, whether success or failure for a given S, the E kept verbal interactions at a minimum, simply stated "Let's try again," and proceeded to the next trial.

Incentive Reproduction (Recall)

At the end of 15 imitation trials, E informed S that additional prizes could be earned contingent on the reproduction of novel and self-reinforcing responses demonstrated by the particular M previously observed. In summary, S was asked to do what M did, and say what M said, both before and after the instrumental response of selecting a cup.

As S performed specific behaviors matching M's repetoire, E provided verbal praise and candy rewards. Responses by S that matched those demonstrated by the M observed were recorded by Os in an adjoining room via video monitor. After sufficient time had elapsed for the immediate recall of M's behaviors, the E administered a large number of additional success trials to erase possible effects of original manipulated self-evaluation treatments. At this point, S was thanked for his cooperation, praised for task performance, and excused from the experiment.

Dependent Variables

Basic data of the experiment consisted of behavioral observations of Ss performance of novel and self-reinforcing, motor and verbal responses that matched those of the M (either HPM or LPM) observed during vicarious learning trials. Data were collected during two phases of the experiment, from the monitor, using an observational checklist designed specifically for the study.

Imitation data collected by two Os consisted of S's performances during imitation trials that matched those of the particular M that S had observed during vicarious learning trials. The Os monitored S's performance by trials and checked matching behaviors as they appeared in the response sequence.

Incentive reproduction (recall) data consisted of S's performances that matched those of the M observed when S was asked by E to demonstrate M's behaviors. Using the observation instrument, Os checked the appearance of model behaviors demonstrated by S that matched those in M's behavioral repetoire. Videotaped replay of some Ss during imitation and incentive reproduction conditions served as a validity check on scores recorded by Os.

To minimize the effects of observer bias, Os were requested to remain silent during data collection and to refrain from discussing how a particular behavior should be scored. Data used for subsequent statistical analyses had to meet a 100% reliability criterion. Only those behaviors scored as matching responses by both Os were included as true experimental data.

Results

Imitation of Novel and Self-Reinforcing Responses

Scores for the imitation of novel responses for each S consisted of the total number of responses emitted during imitation trials that matched motor and verbal, novel behaviors demonstrated by the M (either HPM or LPM) observed during vicarious learning trials. On any single imitation trial, S could attain a maximum score of 4 matching responses (2 motor; 2 verbal). The total possible number of novel matching responses for an individual S over fifteen imitation trials was 60.

Scores for the imitation of novel responses were subjected to a 3 X 2 factorial analysis of variance following procedures suggested by Bruning and Kintz (1968, p. 25). Table 1 presents a summary of the ANOVA on the total

number of novel responses imitated. Consistent with the hypotheses, only the

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Insert Table 1 about here

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interaction effect between manipulated self-evaluation and model performance conditions was significant ($F = 5.614$, $p < .01$). Whether a particular S imitated novel responses demonstrated by M depended upon original level of manipulated self-evaluation and the performance characteristics of the M observed.

To analyze group differences represented by the interaction effect, one-tailed t tests for the difference between two independent means were applied to novel response imitation scores within self-evaluation levels and between model performance conditions. These analyses indicated that HSE Ss, exposed to a HPM, imitated significantly more novel behaviors ($t = 2.60$, $p < .01$) than HSE Ss exposed to a LPM. In addition, LSE Ss exposed to LPM imitated significantly more novel behaviors ($t = 3.04$, $p < .005$) than LSE Ss exposed to HPM. Control Ss exposed to HPM did not differ from Control Ss exposed to LPM in the number of novel behaviors imitated.

Scores for the imitation of self-reinforcing responses for each S consisted of the total number of responses emitted during imitation trials that matched motor and verbal self-reinforcing behaviors demonstrated by the M observed during vicarious learning trials. On any single imitation trial, S could attain a maximum score of 3 matching responses (2 motor, 1 verbal). The total possible number of self-reinforcing matching responses for a given S over 15 imitation trials was 45.

Results of a 3 X 2 factorial ANOVA applied to these data are presented in Table 2. Again, only the interaction between experimental treatments and model

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Insert Table 2 about here

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performance conditions was significant ($F = 5.46$, $p < .01$). Whether a particular

TABLE 1

Summary of Analysis of Variance for Total Number of Motor and Verbal Novel Responses Imitated

Source	df	MS	F	p
Total	59	-	-	-
Model (M)	1	29.40	0.505	n.s.
Self-Evaluation (S)	2	24.32	0.417	n.s.
M X S	2	327.07	5.614	<.01
Error	54	58.26	-	-

TABLE 2

Summary of Analysis of Variance for Total Number of Motor and Verbal Self-Reinforcing Responses Imitated

Source	df	MS	F	p
Total	59	-	-	-
Model (M)	1	8.82	1.35	n.s.
Self-Evaluation (S)	2	10.40	1.59	n.s.
M X S	2	35.68	5.46	<.01
Error	54	6.53	-	-

S imitated self-reinforcing responses demonstrated by M depended upon original level of manipulated self-evaluation and the performance characteristics of the M observed during vicarious learning trials.

Analyses of means indicated significant differences in the imitation of self-reinforcing responses between HSE/HPM and HSE/LPM groups ($t = 2.48$, $p < .025$). Comparisons between LSE groups exposed to HPM and LPM respectively, and Control groups exposed to HPM and LPM respectively were not significant.

Incentive Reproduction (Recall) of Novel and Self-Reinforcing Responses

Scores for reproduction of novel responses for each S consisted of the total number of responses emitted during incentive reproduction conditions that matched novel responses demonstrated by the M (either HPM or LPM) observed during vicarious learning trials. The total possible number of novel responses reproduced during incentive reproduction conditions for an individual S was 4 (2 motor, 2 verbal).

Scores for the reproduction of novel responses were subjected to a 3 X 2 factorial ANOVA to test for main and interaction effects. Neither the main effects of model performance conditions ($F = 1.47$) and self-evaluation treatments ($F = 1.03$), nor their interactive effects ($F = 1.89$) were significant. Self-evaluation treatments and model performance conditions neither singularly, nor in combination, differentially affected the number of novel responses recalled during incentive reproduction conditions. This finding is not surprising owing to the small range (2.7 to 3.4) in the mean number of novel responses reproduced by groups in the study.

Scores for the reproduction of self-reinforcing responses for each S consisted of the total number of responses emitted during incentive reproduction conditions that matched motor and verbal self-reinforcing behaviors demonstrated by the M (either HPM or LPM) observed during vicarious learning trials. The

total possible number of self-reinforcing responses reproduced during incentive reproduction conditions for an individual S was 5 (2 motor; 3 verbal).

A 3 X 2 ANOVA applied to these data indicated that neither the main effects of model performance conditions ($F = .063$) and self-evaluation treatments ($F = 1.00$), nor their interactive effects ($F = 1.04$) were significant. Self-evaluation treatments and model performance conditions neither singularly, nor in combination, affected the number of self-reinforcing responses recalled during incentive reproduction conditions. For these scores, mean differences between groups varied from 2.6 to 3.3.

Discussion

Overall findings of the experiment provide strong support for past research indicating that patterns of novel and self-reinforcing behavior can be acquired through vicarious processes without Ss themselves being administered any direct reinforcement by external means. In addition, results generally support the hypothesis that subject variables (self-evaluation levels in relationship to the experimental task) interact with model characteristics in determining the degree to which novel and self-reinforcing behaviors learned through vicarious processes are subsequently performed.

Major results of the study indicated that independent variables had their primary effects on the immediate performance of vicariously learned behaviors. While immediate performance differences in matching responses (imitation scores) between groups exposed to varying self-evaluation treatments and model performance conditions were evident, these differences were erased during incentive reproduction conditions, a finding consistent with stated hypotheses of the study. These data are interpreted as providing evidence for the effects of subject variables on the immediate performance of vicariously learned novel and self-reinforcing behaviors.

During imitation trials, Ss in this study tended to perform more of the total number of novel and self-reinforcing behaviors of a M whose performance was "self" consistent. Immediate reinforcement experiences consonant with the success or failure demonstrated by a HPM or LPM served to facilitate and/or inhibit Ss matching of M's novel and self-reinforcing behaviors. Evidence for the effectiveness of experimental treatments in producing differing amounts of lerning, on the other hand, was not forthcoming.

Data in this study point out that the degree to which novel responses demonstrated by models are imitated by observing Ss cannot be predicted from rinforcing consequences accrued by the M alone. Novel responses by HPM were consequated on 13 of 15 trials by successful outcomes. For LPM, novel behaviors generated positive outcomes on only 2 of 15 trials. If reinforcing consequences alone accounted for imitation of novel behavior, then Ss would seemingly have imitated more of the total novel behaviors of HPM than LPM regardless of self-evaluation treatments. In addition, Control Ss, devoid of task experience, did not differ significantly in this regard.

Apparently, discrepancies between Ss' rated self-evaluation levels derived from success and failure experiences, and consequences generated by the novel performances of adult models, serve to inhibit the performance of novel responses. Similarly, when Ss are exposed to Ms exhibiting instrumental acts that generate consequences consonant with their own past experiences, imitation is facilitated. Group scores for the imitation of novel responses in this experiment are directionally consistent with this interpretation.

Analyses of the data indicated that experimental treatments and conditions interacted in determining imitation of self-reinforcing behavior. Large differences between HSE/HPM and HSE/LPM groups accounted for most of the total variance contributing to this effect. Apparently, self-evaluation levels and

model performance conditions do not singularly account for the extent to which vicariously learned self-reinforcing behaviors are imitated.

Contrary to stated hypotheses, differences between LSE/HPM--LSE/LPM and Control/HPM--Control/LPM in the imitation of self-reinforcing behaviors were not significant. A parsimonious explanation of these findings might center on examining the number of occasions during imitation trials on which novel and self-reinforcing behaviors would be expected to occur. The relatively low number of self-reinforcing behaviors performed, when compared to novel behaviors, during imitation trials, may have been an artifact of the number of occasions on which these behaviors were expected to occur.

During imitation trials, Ss received 10 trials where outcomes (either success or failure) were consistent with model performance conditions observed. For example, Ss observing a HPM were successful on 10 imitation trials; Ss exposed to LPM were unsuccessful on 10 imitation trials. Only on these trials would a given S be expected to imitate self-reinforcing behaviors that matched those of the model observed. Novel behaviors, on the other hand, would be expected to occur on all 15 imitation trials, resulting in higher group imitation scores. If a greater number of imitation trials and a more complex sequence of self-reinforcing behaviors had been included in the procedure, differences between LSE/HPM--LSE/LPM and Control/HPM--Control/LPM groups may have reached significance like novel response imitation scores.

An alternative explanation of low imitation of self-reinforcing behavior might consider that Ss brought to the experimental setting a wide variety of self-reinforcing behaviors (both positive and negative) that could easily proactively interfere with performance during imitation trials. While Ss demonstrated a variety of self-reinforcing behaviors during imitation trials, only responses that matched those of the M observed were recorded as true imitation data. In addition, the greater potency of novel, as opposed to self-reinforcing

model cues, in eliciting imitative responses, may have been due to their instrumental and somewhat "mystical" appearance to the S, as well as their more frequent occurrence.

In general, motor behaviors were more potent sources of imitative learning and performance than verbal behaviors. This finding is consistent with past research (Bandura, 1965a) demonstrating that young children, who have greater motor than verbal development, can produce a substantially higher percentage of imitative motor responses than matching verbalizations.

Evidence for vicarious learning (as opposed to performance) was demonstrated under incentive reproduction (recall) conditions. Performance differences recorded during imitation trials were erased when Ss were offered incentives for matching M's behaviors, providing evidence for essentially equivalent amounts of learning between Ss regardless of treatment group. These findings support those of previous research (Bandura, 1965a), and serve to emphasize the importance of distinguishing between vicarious learning, and the performance of vicariously learned behaviors. Although learning must necessarily be inferred from overt performance, it is assumed that matching responses reproduced under incentive conditions provide a more accurate index of response acquisition, than matching responses recorded during imitation trials.

Table 3 provides data useful in interpreting the relative amount of

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Insert Table 3 about here

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vicarious learning for all groups that occurred in the present experiment. While some group differences are evident, the relative percentages indicate the large number of matching responses that occurred for all Ss when offered additional incentives for reproducing observed model behaviors. Consistent with performance data pointing out the potency of motor modeling cues, Ss in all groups combined reproduced a greater total percentage of matching motor than

TABLE 3

Percentages of the Total Possible Number of Responses Reproduced During Incentive Reproduction for Each Group

GROUPS	Novel Responses		Self-Reinforcing Responses		Row $\bar{X}$s
	Motor	Verbal	Motor	Verbal	
I. HSE/HPM	85.00	60.00	75.00	56.67	66.67
II. HSE/LPM	100.00	70.00	80.00	36.67	71.67
III. LSE/HPM	80.00	70.00	55.00	60.00	77.25
IV. LSE/LPM	75.00	70.00	90.00	50.00	53.33
V. Control/HPM	85.00	55.00	50.00	53.33	60.83
VI. Control/LPM	80.00	55.00	85.00	33.33	63.33
Column $\bar{X}$s	84.17	63.33	70.83	48.33	66.67
*N =	20.00	20.00	20.00	20.00	

* Total number of possible responses for each group

verbal responses.

Investigations comparing the effects of vicarious and direct reinforcement on learning (Kanfer and Marston, 1963) indicate that resultant changes in the behavior of observers are generally of the same magnitude under both conditions. Other studies have demonstrated that vicarious reinforcement processes are controlled by experimental variables such as the percentage (Kanfer, 1965; Kanfer and Marston, 1963), intermittency, magnitude (Bruning, 1965), and frequency (Rosenbaum and Tucker, 1962) of reinforcement in essentially the same manner as when directly applied to overt performances of the subject.

In providing an interpretation of how vicarious reinforcement leads to learning, Bandura (1965b) explains that vicarious reinforcing events conceivably direct an observer's attention to, and provide information about, reinforcement contingencies associated with particular kinds of behavior. According to Bandura (1965b), "imaginal and verbal representations of modeling stimuli constitute the enduring learning products of observational experiences" (p. 47). In addition, motivational and reinforcement variables are considered to influence the level of response acquisition by facilitating or inhibiting observational responses and facilitating covert rehearsal of modeling stimuli. The performance of previously learned imitative responses, however, is considered to be governed primarily by reinforcement-related variables.

The fact that many Ss in the present study (as well as those in a host of other research efforts) failed to reproduce M's behavioral repertoire, seemingly indicates that contiguity of sensory stimulation, in the form of symbolic representations in Ss and reinforcing consequences accruing to models, is a necessary but not a sufficient condition for imitative response acquisition. Though HSE, LSE, and Control Ss evidenced essentially equivalent amounts of learning as measured by matching responses reproduced, vicarious reinforcement

varied considerably between HPM and LPM conditions during vicarious learning trials. Under these conditions, the level of response acquisition was quite similar, a finding seemingly contrary to views relegating the role of external reinforcement to the augmentation and reduction of levels of learning.

If reinforcement ostensibly effects variations in the degree to which vicarious learning takes place, then Ss exposed to HPM conditions should have reproduced a greater number of matching behaviors than Ss exposed to LPM, since HPM behaviors were more frequently consequated by positively reinforcing outcomes. In addition, Ss exposed to LPM observed reinforcing consequences on only 2 of 15 vicarious learning trials. However, they reproduced as many matching responses under recall conditions as Ss exposed to HPM. Variations in the frequency of vicarious reinforcement between Ss produced essentially no differences in learning in the present study.

An alternative explanation of these learning data might stem from "contrast-of-reinforcement" effects demonstrated in studies of direct reinforcement (Buchwald, 1959, Crandall, 1963), in which nonreward following punishment functions analagous to a positive reinforcer, and nonreward subsequent to a series of rewards functions as a negative reinforcer. This conception might well explain learning for Ss in the LSE/LPM group. In addition, Walters and Parke (1964) have shown that unconsequated, socially disapproved behavior demonstrated by a model can increase the incidence of matching behavior to levels produced by the observation of rewarding consequences. Thus, equivalent amounts of learning for Ss in HSE/LPM and Control/LPM conditions might be predicted from this formulation.

The implications for theories of vicarious learning provided by data in the present study seem clear. A broadening of principles related to the complex effects of vicarious reinforcement on learning seems necessary. While

reinforcing consequences accruing to a model may well serve an attentional, informational, and motivational function, they seem, in addition, to interact with subject variables and general reinforcement history of the organism in determining vicarious learning outcomes.

Results of the present study do not unconditionally support theoretical notions viewing reinforcement-related variables as sole determiners of the performance of vicariously learned behaviors. The probability that imitated behaviors will generate rewards is undoubtedly a factor determining imitation. However, Ss in LPM conditions imitated a significant number of LPM novel behaviors in the present study, even though these responses were consequated by positive rewards on few occasions. If current conceptions of the function of reinforcement-related variables were adequate, then these Ss should have imitated fewer LPM behaviors. Interaction effects between manipulated self-evaluation treatments and model competence conditions in the present study necessitate consideration of subject characteristics as potent variables influencing the performance of vicariously learned behaviors.

A more exact understanding of the manner in which vicarious reinforcement variables affect the acquisition and performance of imitative responses might have been derived from simple changes in experimental design. The inclusion of a no-consequence model performance control group could generate information about the extent to which manipulated self-evaluation levels alone account for vicarious learning and performance of both novel and self-reinforcing model behaviors.

Future studies investigating the effects of theoretical variables on vicarious learning and performance might profit from the finding that motor behaviors were more potent sources of imitation than verbal behaviors. Eliminating verbal model cues and increasing the complexity of motor sequences can provide a more

sensitive dependent measure of vicarious learning and performance; one more sensitive to a variety of experimental treatments easily investigated in complex factorial designs.

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